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RASPBERRY PRODUCTION COSTS IN ONTARIO 1984

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RASPBERRY PRODUCTION COSTS IN ONTARIO 1984

by

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SUMMARY

An increasing need for current information on growing raspberries led to a concensus meeting to develop a budget for this cost of production study.

Establishment of a raspberry patch is usually a three-year period including preplanting, planting, and growing years. Harvesting then occurs for a five-year period.

The cost to establish the patch is estimated at $4,397 per acre. This cost includes $585 per acre in the preplant year, $2,587 in the planting year, and $1,225 in the growth year.

Amortizing the establishment cost at 7.1 percent (the lending rate adjusted for inflation) over the five producing years gives an annual cost of $1,076 per acre to be added to the annual costs of producing and harvesting.

Raspberries are either sold "commercially" on the fresh market or "pick-your-own". Preharvest costs of $1,184 per acre are the same for both methods of marketing.

The commercial system of harvesting at a yield of 2,700 pints per acre costs $2,038 per acre while the pick-your-own system costs $365 per acre to harvest.

The average yield in Ontario during the last three years leaves the grower below the break-even level when the raspberries are sold at current market prices.

In the pick-your-own system, a yield of approximately 3,500 pints per acre is needed to break-even at a selling price of $1.00 per pint.

For a commercial pick, a yield of approximately 3,800 pints an acre is needed to break-even at a price of $1.50 per pint.

THE RASPBERRY INDUSTRY IN ONTARIO

Although raspberries are not a major fruit crop in Ontario, they provide growers with nearly $2 million of early-season income. Gross returns have increased steadily since the mid-seventies although there has been only a marginal increase in acreage. In the five-year period 1979-83, gross returns averaged $1,393,800, more than double the returns of the previous five-year period (Table 1).

Table 1.--Raspberry Area, Production and Farm Value, Ontario 1964-1983

Year	Area		Marketed production	Farm value
	Bearing	Non-Bearing		
	acres		'000 pints	$'000
1983.....	606	70	1,712	1,862.0
1982.....	645	77	1,868	1,752.7
1981.....	582	63	1,432	1,301.3
1980.....	597	83	1,650	1,168.3
1979.....	571	67	1,362	884.8
1978.....	563	50	1,198	707.2
1977.....	558	30	1,290	695.4
1976.....	580	45	1,178	600.2
1975.....	619	56	1,202	533.9
1974.....	771	90	1,454	552.4
1973.....	865	89	1,566	536.6
1972.....	900	87	1,699	466.1
1971.....	974	128	2,406	568.5
1970.....	996	70	2,129	566.7
1969.....	1,045	129	2,158	583.8
1968.....	1,142	121	2,228	593.0
1967.....	1,299	168	2,826	686.2
1966.....	1,509	211	2,280	533.4
1965.....	1,578	257	4,166	860.5
1964.....	1,672	268	4,716	919.5
5-year average				
1979-83.....	600	72	1,605	1,393.8
1974-78.....	618	54	1,264	617.8
1969-73.....	956	101	1,992	544.3
1964-68.....	1,440	205	3,243	718.5

Source: Agricultural Statistics for Ontario, Publication 20, Ontario Ministry of Agriculture and Food.

Yield per bearing acre has also shown a steady increase since the late sixties, averaging 2,674 pints in the 1979-83 period (Table 2). Average price has increased dramatically from 22.2 cents per pint during 1964-68 to 86.9 cents during 1979-83. A combination of increased yields and higher price have resulted in gross returns per bearing acre topping $3,000 in 1983.

Table 2.--Yield, Price and Gross Returns for Raspberries, Ontario, 1964-1983

Year	Yield per bearing acre	Farm value per pint	Gross returns per bearing acre
	pints	cents	dollars
1983.....	2,825	108.8	3,073
1982.....	2,896	93.8	2,717
1981.....	2,460	90.9	2,236
1980.....	2,764	70.8	1,957
1979.....	2,385	65.0	1,550
1978.....	2,128	59.0	1,256
1977.....	2,312	53.9	1,246
1976.....	2,031	51.0	1,035
1975.....	1,942	44.4	863
1974.....	1,886	38.0	717
1973.....	1,810	34.3	620
1972.....	1,888	27.4	518
1971.....	2,470	23.6	584
1970.....	2,138	26.6	569
1969.....	2,065	27.1	558
1968.....	1,951	26.6	519
1967.....	2,176	24.3	528
1966.....	1,511	23.4	353
1965.....	2,640	20.7	545
1964.....	2,821	19.5	550
5-year average			
1979-83.....	2,674	86.9	2,322
1974-78.....	2,045	48.9	999
1969-73.....	2,083	27.3	569
1964-68.....	2,252	22.2	499

Source: Agricultural Statistics for Ontario, Publication 20, Ontario Ministry of Agriculture and Food.

The increased gross return and the rising popularity of "pick-your-own" farms should accelerate a rise in acreage of raspberries in Ontario. Growers should be aware however, that despite increased gross returns, net returns are barely covering costs and higher yields are needed to make the crop profitable.

STUDY BACKGROUND

There has been an increasing need for current cost of production information and budget data by growers, potential growers, researchers and others involved with the raspberry industry in Ontario. The last Ontario study on the cost of production of raspberries was completed for the 1967 crop.

Data for the study conducted in 1984 was obtained by means of a concensus meeting of producers, Plant Industry Branch fruit specialists, and Economics and Policy Coordination Branch economists. The production system, the cultural operations to be performed, and the physical inputs needed to produce a crop of raspberries were agreed upon at this meeting. These factors were then used in the ACRES crop budgeting program[1] to determine the cost of production.

The estimated costs are based on a production system that involves three establishment years followed by five production years. Costs were calculated for two harvesting methods, namely harvesting by the grower with employees (called "commercial" in the context of this report) and secondly, "pick-your-own" harvesting.

METHODS AND PROCEDURES

The costs were organized into variable and fixed components. Variable costs are those that vary directly with the area or amount of each crop grown. They include seed, plants, hired labor, fertilizer, sprays, machinery operating costs, and interest on operating capital. Fixed costs are operator labor, management allowance, interest on land, taxes, interest and depreciation on machinery, and other overhead costs.

The following section briefly describes how each input item was treated.

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[1] G. Lentz and B. Campbell, A Computer Program for Generating Crop Enterprise Budgets, Economics Information, (Toronto: Economics and Policy Coordination Branch, September, 1984)

LABOR

Operator labor was valued at $6.50 per hour. In addition, an allowance to management was made at the rate of five percent of gross income.

The hired labor cost was calculated on a per-hour basis and included benefits such as worker's compensation, unemployment insurance, and the Canada Pension Plan. Semi-skilled labor was charged at $4.50 per hour and unskilled labor at $3.00 per hour. Picking labor was paid a piece-work rate of 50 cents per pint.

MATERIALS

The amount of each material input was based on commonly used practices. Input prices were based on averages charged by the trade. Because of the multitude of products available, no trade names for pesticides are given in this report. Instead, these products are grouped as herbicides, insecticides, fungicides, and miticides.

TRACTORS AND MACHINERY

The machinery complement used in the raspberry budget was assumed to be five years old. Tractor and machine costs included depreciation, interest on investment, insurance, storage, repairs, maintenance, fuel and lubrication. If machines were used for other farming operations, costs were adjusted based on the proportion of use on the raspberry crop.

The declining balance method of depreciation was used, and a 15 percent rate to powered and a 10 percent rate to non-powered machines was applied.

Interest on the machinery investment was calculated by assuming that the equity portion was 70 percent and the debt portion was 30 percent of the total depreciated value. For this report, interest on equity was calculated at 7.75 percent which was the average interest rate paid by chartered banks on savings accounts. The interest on the debt portion was based on the average prime rate of 12 percent plus one for a total of 13 percent.

Insurance and storage or housing costs for machinery were based on 1.5 percent of their purchase price.

Repair and maintenance costs for individual machines were based on the factsheet "Cost of Owning and Operating Farm Machines", Agdex 825, Ontario Ministry of Agriculture and Food.

Fuel costs were based on the size of each tractor or self-propelled machine used in the production cost estimates. The following farmgate fuel prices were used:

Gasoline 36.5¢/litre Diesel 36.5¢/litre

The cost of oil, grease and filters was calculated at 15 percent of the fuel cost.

LAND

Determining the annual cost for land is a controversial part in any study on production costs. During the past two decades, purchasers of farmland have been willing to pay more for it than can be justified from agricultural production. Purchasers believe the speculative aspect of land ownership offers benefits above those received from crop production. It is necessary to remove the inflation component from the interest rate, leaving the opportunity cost, risk, and other time preference factors. For this reason the appropriate interest rate used in calculating the interest cost on bare land for the raspberry cost estimate was the real interest rate. The "real interest rate" is defined as the current lending rate adjusted for inflation.

In this report, interest on land investment was calculated as follows:

1. The value of bare land was estimated at $2,023 per acre or $5,000 per hectare for the type of farmland used for raspberry production.

2. The interest rate applied was the current lending rate discounted for the rate of inflation which resulted in a 7.1 percent rate.

The farm real estate tax of $10 per acre was used. This rate is net of the Ontario Farm Tax Rebate.

INTEREST ON OPERATING CAPITAL

Interest on operating capital for the preplant, planting and growth years was calculated from the time an expenditure was incurred until the start of the production or fruiting year. Interest in the production year was calculated from the time an expenditure was incurred until the time income was generated from sales. Operating capital includes the cost of materials, fuel, repairs, hired labor, and other cash items. In this report, the interest rate applied to operating capital was the average prime rate plus 1 percent or 13 percent.

SPECIALIZED EQUIPMENT

This category includes cash registers, scales, and other items needed for pick-your-own operations.

TRICKLE IRRIGATION SYSTEM

The pump for the trickle irrigation system is included with the other farm machinery and is treated as a depreciable asset. The lines and nozzles are assumed to last for the life of the raspberry patch and therefore the cost is amortized with establishment costs.

OTHER OVERHEAD

This allowance covers such items as the raspberry crop's share of utilities, accounting and administration costs, use of the farm automobile, and general farm maintenance.

RASPBERRY PRODUCTION COSTS IN ONTARIO

ESTABLISHMENT

A good site is one of the prime considerations when deciding to grow raspberries. Good soil with adequate drainage is best suited for raspberry production. Access to a water supply for irrigation should also be considered before selecting a planting site.

During the preplant year, the field is worked and green manure crop is sown and fertilized. Weed control is important and should start in the preplant year with an application of herbicide.

In the spring a seed bed is prepared and 2,000 raspberry canes per acre are planted. Trickle irrigation is set up on the field and a cover crop is sown between the rows. A fungicide and insecticide are applied to the canes and 20 hours of hand labor are required to hoe, weed, and remove blossoms. Posts for the trellis system are also installed in the planting year.

Total variable costs in the preplant and planting year are $2,309 per acre (Tables 3 and 4). Over 70 percent of the costs are for materials including $650 for lines and nozzles for the trickle irrigation system. The pump is costed with the other machinery. Interest on operating capital is calculated to the beginning of the harvest year and totals over $400 per acre.

Fixed costs totalled $863 an acre including a two-year charge for land of $288. The other overhead charge of $100 is included to cover incidentals related to the crop.

Total cost per acre at the end of the planting year is $3,172.

Table 3.--Raspberry "Preplant Year" Costs for Commercial Harvest and Pick-Your-Own Operations, Ontario, 1984

	Cost	
	per ha[a]	per ac.
	dollars	
VARIABLE COSTS		
Fertilizer:		
8-32-16, 150 kg/ha	42	17
Am. nitrate, 100 kg/ha	25	10
Herbicides	519	210
Green manure seed	17	7
Tractor and machine costs:		
Repairs and maintenance	25	10
Fuel	37	15
Interest on operating capital	215	87
TOTAL	880	356
FIXED COSTS		
Operator labor, 12.4 hours/ha	79	32
Tractor and machine costs:		
Depreciation	62	25
Interest on investment	32	13
Insurance and storage	12	5
Interest on land	355	144
Taxes	25	10
TOTAL	565	229
TOTAL PREPLANT YEAR COSTS	1,445	585

[a]Cost per hectare may be converted to cost per acre by dividing by 2.4711.

Table 4.--Raspberry "Planting Year" Costs for Commercial Harvest and Pick-Your-Own Operations, Ontario, 1984

	Cost	
	per ha	per ac.
	dollars	
VARIABLE COSTS		
Hired labor, 89 hours/ha	311	126
Fertilizer:		
15-15-15, 445 kg/ha	114	46
10-52-10, 14 kg/ha	32	13
Insecticides	15	6
Fungicides	17	7
Plants, 2,000/acre	1,483	600
Cover crop seed	59	24
Trickle irrigation system	1,606	650
Trellis posts	153	62
Tractor and machine costs:		
Repairs and maintenance	138	56
Fuel	109	44
Interest on operating capital	788	319
TOTAL	4,825	1,953
FIXED COSTS		
Operator labor, 55.6 hours/ha	361	146
Tractor and machine costs:		
Depreciation	316	128
Interest on investment	195	79
Insurance and storage	67	27
Interest on land	355	144
Taxes	25	10
Other overhead costs	247	100
TOTAL	1,566	634
TOTAL PLANTING YEAR COSTS	6,391	2,587

GROWTH YEAR

During the growth year, fertilizer, a herbicide, insecticides, and fungicides are applied and the trellis wire is installed. The grass is mowed three times and the patch is irrigated. Thirty hours of labor is used to thin canes.

Total variable costs totalled $739 per acre with materials representing 58 percent of this amount (Table 5). Hired labor was $176 per acre while interest on operating capital was $45.

Fixed costs were $486 per acre for a total growth year cost of $1,225 per acre.

Table 5.--Raspberry "Growth Year" Costs for Commercial Harvest and Pick-Your-Own Operations, Ontario, 1984

	Cost	
	per ha	per ac.
	dollars	
VARIABLE COSTS		
Hired labor, 121 hours/ha	435	176
Fertilizer, 17-17-17, 340 kg/ha	92	37
Insecticides	57	23
Fungicides	393	159
Herbicides	7	3
Trellis wire	494	200
Tractor and machine costs:		
Repairs and maintenance	180	73
Fuel	57	23
Interest on operating capital	111	45
TOTAL	1,826	739
FIXED COSTS		
Operator labor, 29.7 hours/ha	193	78
Tractor and machine costs:		
Depreciation	208	84
Interest on investment	129	52
Insurance and storage	44	18
Interest on land	355	144
Taxes	25	10
Other overhead costs	247	100
TOTAL	1,201	486
TOTAL GROWTH YEAR COSTS	3,027	1,225

TOTAL ESTABLISHMENT COSTS

The cost of establishing the raspberry field can be determined by totalling the preplant year ($585), planting year ($2,587), and growth year ($1,225) to give a total cost of $4,397 per acre. The field is to be harvested for five years and therefore the establishment cost should be amortized over the five production years.

Since no allowance is made for inflation over the eight year production cycle, an amortization rate of 7.1 percent, which is the lending rate adjusted for inflation, is used. Amortizing the $4,397 establishment cost using a 7.1 percent rate gives an annual cost of $1,076 per acre for each year of the five production years (Table 6).

Table 6.--Amortization of Raspberry Establishment Costs for Commercial Harvest and Pick-Your-Own Operations, Ontario, 1984

	Cost	
	per ha	per ac.
	dollars	
Preplant year	1,445	585
Planting year	6,391	2,587
Growth year	3,027	1,225
TOTAL ESTABLISHMENT COST	10,863	4,397
Annual amortized cost[a]	2,657	1,076

[a]Amortization rate is 7.1 percent for a five-year period.

PRODUCTION AND HARVESTING

Similar preharvest operations are carried out on the raspberry patch whether the field is for commercial picking or pick-your-own. Materials once again account for a large portion (52 percent) of the variable costs (Table 7). Pruning, cane removal, mowing, and trellis maintenance are the other main operations carried out on the patch. Total variable costs are $734 per acre and fixed costs are $450 resulting in a preharvest cost of $1,184 per acre.

Table 7.--Raspberry Preharvest Costs for Commercial Harvest and Pick-Your-Own Operations, Ontario, 1984

	Cost	
	per ha	per ac.
VARIABLE COSTS	dollars	
Hired labor, 123.6 hours/ha	482	195
Fertilizer, 17-17-17, 340 kg/ha	92	37
Insecticides	57	23
Fungicides	393	159
Herbicides	180	73
Miticides	138	56
Trellis materials	62	25
Tractor and machine costs:		
Repairs and maintenance	245	99
Fuel	109	44
Interest on operating capital	57	23
TOTAL	1,815	734
FIXED COSTS		
Operator labor, 87.7 hours/ha	571	231
Tractor and machine costs:		
Depreciation	294	119
Interest on investment	183	74
Insurance and storage	64	26
TOTAL	1,112	450
TOTAL PREHARVEST COSTS	2,927	1,184

With the commercial system of harvesting, the major share of variable costs is for picking labor. At a rate of 50 cents per pint, labor costs for a 2,700 pint yield are $1,350 plus a $30 per acre charge for assembling masters (Table 9). With the pick-your-own system, the hired labor is used for supervision and checking out customers. Container costs average 12.5 cents per pint when picked commercially but do not exist under the pick-your-own system. Total harvesting costs of pick-your-own are $365 per acre compared to $2,038 for a commercially picked field.

Table 8.--Raspberry Harvest Costs for Commercial Harvest and Pick-Your-Own Operations, Metric Units, Ontario, 1984

	Harvest costs	
	Commercial	Pick-your-own
	$/hectare	
VARIABLE COSTS		
Hired labor:		
Commercial, 858.7 hours/ha.....	3,410	-
Pick-your-own, 74.1 hours/ha....	-	297
Containers:		
Pints, 6,672 pints/ha.....	388	-
Masters, 556/ha.....	445	-
Tractor and machine costs:		
Repairs and maintenance.....	69	69
Fuel.....	32	32
Comfort station rental.....	37	37
Interest on operating capital.....	32	5
TOTAL.....	4,413	440
FIXED COSTS		
Operator labor:		
Commercial, 74.1 hours/ha.....	482	-
Pick-your-own, 49.4 hours/ha....	-	321
Tractor and machine costs:		
Depreciation.....	77	77
Interest on investment.....	47	47
Insurance and storage.....	17	17
TOTAL.....	623	462
TOTAL HARVESTING COSTS.....	5,036	902

Table 9.--Raspberry Harvest Costs for Commercial Harvest and Pick-your-own Operations, Imperial Units, Ontario, 1984

	Harvest costs	
	Commercial	Pick-your-own
	$/acre	
VARIABLE COSTS		
Hired labor:		
Commercial, 347.5 hours/acre.....	1,380	-
Pick-your-own, 30 hours/acre.....	-	120
Containers:		
Pints, 2,700/acre.....	157	-
Masters, 225/acre.....	180	-
Tractor and machine costs:		
Repairs and maintenance.....	28	28
Fuel.....	13	13
Comfort station rental.....	15	15
Interest on operating capital.....	13	2
TOTAL.....	1,786	178
FIXED COSTS		
Operator labor:		
Commercial, 30 hours/acre.....	195	-
Pick-your-own, 20 hours/acre.....	-	130
Tractor and machine costs:		
Depreciation.....	31	31
Interest on investment.....	19	19
Insurance and storage.....	7	7
TOTAL.....	252	187
TOTAL HARVESTING COSTS.....	2,038	365

Interest on land and taxes are the same for both commercial and pick-your-own operations (Table 11). The other overhead charge is for items such as utilities, accounting and administration charges, general farm upkeep, and use of the farm automobile. An allowance for management is based on 5 percent of gross returns and is therefore higher for commercially picked berries because they sell for a higher price. Pick-your-own operations have been allotted $150 an acre for advertising as well as $150 an acre for specialized equipment such as cash registers, scales, and a checkout area.

Table 10.--Raspberry Overhead Costs for Commercial Harvest and Pick-your-own Operations, Metric Units, Ontario, 1984

	Overhead costs	
	Commercial	Pick-your-own
	$/hectare	
Interest on land	355	355
Taxes	25	25
Management allowance	499	334
Advertising	-	370
Checkout equipment rental	-	370
Other overhead costs	370	370
TOTAL OVERHEAD COSTS	1,249	1,824

Table 11.--Raspberry Overhead Costs for Commercial Harvest and Pick-your-own Operations, Imperial Units, Ontario, 1984

	Overhead costs	
	Commercial	Pick-your-own
	$/acre	
Interest on land	144	144
Taxes	10	10
Management allowance	202	135
Advertising	-	150
Checkout equipment rental	-	150
Other overhead costs	150	150
TOTAL OVERHEAD COSTS	506	739

TOTAL PRODUCTION COSTS

The annual total cost of establishment, production and harvesting is estimated at $4,804 per acre for commercially harvested raspberries and $3,364 per acre for pick-your-own operations (Table 13). These costs are based on a yield of 2,700 pints per acre sold commercially at $1.50 per pint and on a pick-your-own basis at $1.00 per pint.

Table 12.--Raspberry Total Production Costs[a] for Commercial Harvest and Pick-your-own Operations, Metric Units, Ontario, 1984

	Production cost	
	Commercial	Pick-your-own
	$/hectare	
Amortized establishment cost.....	2,657	2,657
Preharvest costs.....	2,927	2,927
Harvesting costs.....	5,036	902
Overhead costs.....	1,249	1,824
TOTAL COSTS.....	11,869	8,310

[a]Based on a yield of 2,118 kilograms per hectare.

Table 13.--Raspberry Total Production Costs[a] for Commercial Harvest and Pick-your-own Operations, Imperial Units, Ontario, 1984

	Production costs	
	Commercial	Pick-your-own
	$/acre	
Amortized establishment costs.....	1,076	1,076
Preharvest costs.....	1,184	1,184
Harvesting costs.....	2,038	365
Overhead costs.....	506	739
TOTAL COSTS.....	4,804	3,364

[a]Based on a yield of 2,700 pints per acre.

BREAK-EVEN ANALYSIS

Tables 14 and 15 show the prices required to cover total production costs for a range of yields. For yields below and above the 2,700 pints per acre used in this study, adjustments were made for changes in container costs, picking labor, supervision requirements, and management allowance.

Table 14.--Raspberry Break-Even Yields and Prices for Commercial Harvest and Pick-your-own Operations, Metric Units, Ontario, 1984

Five-year average yield	Commercial		Pick-your-own	
kg/ha	$/ha	$/kg	$/ha	$/kg
1,883	11,424	6.07	8,325	4.42
2,118	11,970	5.65	8,399	3.97
2,354	12,526	5.32	8,468	3.60
2,589	13,072	5.05	8,543	3.30
2,825	13,626	4.82	8,617	3.05
3,138	14,362	4.58	8,711	2.78

Table 15.--Raspberry Break-Even Yields and Prices for Commercial Harvest and Pick-your-own Operations, Imperial Units, Ontario, 1984

Five-year average yields	Commercial		Pick-your-own	
pints/acre	$/acre	$/pint	$/acre	$/pint
2,400	4,623	1.93	3,369	1.40
2,700	4,844	1.79	3,399	1.26
3,000	5,069	1.69	3,427	1.14
3,300	5,290	1.60	3,457	1.05
3,600	5,514	1.53	3,487	.97
4,000	5,812	1.45	3,525	.88

The average raspberry yield in Ontario was 2,900 pints per acre in 1982, 2,800 pints in 1983, and an estimated 2,600 pints in 1984. Table 15 shows that yields would need to be considerably above those achieved in the last three years in Ontario before profits can be realized at the current selling prices obtained in most production areas. Common prices in 1984 were $1.50 per pint for commercial berries and $1.00 per pint for pick-your-own. At these prices, growers would need yields of 3,500 pints per acre for pick-your-own and 3,800 pints per acre for commercial pick to break-even on the estimated costs of production.